

ABSTRACT OF THE DISCLOSURE

In order to realize a plasma doping method capable of carrying out a stable low-density doping, exhaustion is carried out with a pump while introducing a predetermined gas into a vacuum chamber from a gas supplying apparatus, the pressure of the vacuum chamber is held at a predetermined pressure and a high frequency power is supplied to a coil from a high frequency power source. After the generation of plasma in the vacuum chamber, the pressure of the vacuum chamber is lowered, and the low-density plasma doping is performed to a substrate placed on a substrate electrode. Moreover, the pressure of the vacuum chamber is gradually lowered, and the high frequency power is gradually increased, thereby the low-density plasma doping is carried out to the substrate placed on the substrate electrode. Furthermore, a forward power P_f and a reflected power P_r of the high frequency power supplied to the substrate electrode are sampled at a high speed, and when a value of which the power difference $P_f - P_r$ is integrated with respect to time reaches a predetermined value, the supply of the high frequency power is suspended.